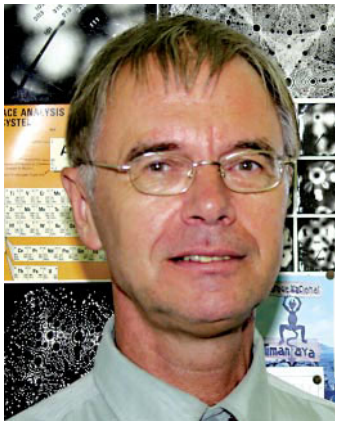

Guest Editorial

Growth of Interest in Catalysis by Gold to be Highlighted at "Gold 2003"

Until 15 years ago it was believed that gold is too inert to be an active constituent of metal catalysts. Recently, however, gold catalysts have attracted an enormous growth of interest, thanks to the pioneering work of, in particular, Haruta and colleagues who showed that gold-based catalysts are extremely active in the oxidation of carbon monoxide if gold is present as nanoparticles on a support. Gold nanoparticles on partly reducible oxides were found to exhibit CO oxidation activity even at sub-ambient temperatures (200K).

Following the first publications the number of papers dealing with gold catalysis has grown in an exponential way. It has been demonstrated that gold-based catalysts exhibit catalytic activity for a wide range of different reactions.

At present, the commercial use of gold-based catalysts is still limited, but the field of gold catalysis is currently undergoing an exciting period of discovery. The forthcoming 'Gold 2003' conference follows the successful 'Catalytic Gold' conference, held in Cape Town, South Africa in 2001.

The programme for 'Gold 2003' is focused on new industrial applications for gold. Possible catalytic applications being explored are abatement of pollutants from exhaust gases of automobiles; elimination of VOC's, dioxins, ozone, nitrogen oxides; selective oxidation and reduction processes and the 'fine chemistry' needed for production of desired products with high selectivity. The low temperature CO oxidation activity may lead to the application of gold-based catalysts in fuel cells to eliminate traces of CO from hydrogen-rich mixtures produced by steam reforming of fuel, in gas sensors, and as a start-up automotive catalyst, for use during the short warm-up period before the present catalysts reach the temperature at which they become effective.

The interest in gold catalysis is a great stimulant for scientists in academia to focus their research on fundamental aspects of catalysis by gold: the role of the particle size, the effect of the partly reducible oxidic additive and of the promoters, the nature of the active species and on the relevance of gold chemistry in general. In our laboratories we are attempting to understand these effects and have investigations of the role of alkali and alkaline earth metal additives and the synergistic effects found when combining gold and a transition metal oxide or ceria. Surface science is playing a particularly important role in providing a mechanistic understanding of the chemical properties of the gold surfaces. We will be presenting some of our recent results at the Gold 2003 conference.

Of special relevance to future developments are the effects to be expected from alloy catalysts. Although gold has been used in the past as a useful additive to other noble metal catalysts to increase their selectivity or modify their activity, it is only recently that these gold alloy catalysts are being shown to have significant commercial applications. BP Chemicals have introduced a new process for making vinyl acetate monomer from ethylene, acetic acid and oxygen using an Au/Pd catalyst in a fluidized bed.

All these different topics will be discussed at the 'Gold 2003' conference. Introductory, keynote and sessional lectures by leading scientists and technologists in combination with poster presentations will highlight the various activities and the latest advances in the exciting field of gold catalysis.

I hope to welcome you in Vancouver!

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